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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ZHENAN BAO

Appeal 2009-005692
Application 10/727,709
Technology Center 2800

Decided: December 14, 2009

Before EDWARD C. KIMLIN, TERRY J. OWENS, and
MARK NAGUMO, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-11. We have jurisdiction under 35 U.S.C. § 6(b).

Claim 1 is illustrative:

1. An apparatus, comprising,

a substrate having a surface;

an organic field-effect transistor located adjacent said surface of said substrate, said transistor comprising a gate, a channel, a source electrode, and a drain electrode; and

wherein said channel comprises a densified layer of organic molecules with conjugated multiple bonds, axes of said organic molecules being oriented substantially normal to said surface.

The Examiner relies upon the following references in the rejection of the appealed claims (Ans. 2):

Speakman	6,713,389 B2	Mar. 30, 2004
Ong	6,777,529 B2	Aug. 17, 2004

Appellant's claimed invention is directed to an apparatus comprising an organic field-effect transistor (OFET) on the surface of a substrate. The transistor comprises, inter alia, a channel comprising a densified layer of organic molecules whose axes are oriented substantially normal to the surface. According to the Appellant's Specification,

> the channel of existing OFETs is low because the density and the uniformity of linear organic molecules packed in the channel are inadequate and [i]ncreasing the density and uniformity of the organic molecules in the channel improves the carrier mobility of the channel [which], in turn, increases the conductivity of the channel and allows the manufacturer of OFET devices with improved sensitivity

(para. [0005]). The Specification provides a description of a densified layer, and how it is made, as follows:

> Herein, a layer of organic molecules 150 is referred to as densified if the layer 150 is physically strained parallel to

> the substrate-surface 110 on which the layer 150 is formed. In a densified layer 150, the strain is a force of expansion that results from an over-density of organic molecules. A densified layer 150 has a strain, because the molecular over-density has not relaxed to a lower value that would be found in a bulk layer of the same composition. The densified layer 150 is too thin for complete relaxation of the strain, which is caused by the over-density of molecules at the substrate-surface. One way to form a densified layer of molecules 150 involves depositing the molecules on a stretched substrate 105 and then, allowing the substrate 105 to unstretch. Such a process can produce an over-density of molecules that would not have occurred if the layer had been formed directly on an unstretched substrate.

(para. [0018]).

Appealed claim 1 stands rejected under 35 U.S.C. § 102(e) as being anticipated by Ong. Claims 2-5 and 8-11 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ong, whereas claims 6-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ong in view of Speakman.

We have thoroughly reviewed the respective positions advanced by Appellant and the Examiner. In so doing, we find that the Examiner's rejections are not supported by the prior art evidence relied upon. Accordingly, we will not sustain the Examiner's rejections.

Concerning the § 102 rejection over Ong, the reference, like Appellant, discloses an apparatus comprising an organic field-effect transistor on a substrate wherein the transistor comprises a channel comprising a layer of organic molecules with conjugated multiple bonds having axes oriented substantially normal to the surface. As recognized by the Examiner, however, Ong does not teach that the organic layer is densified. The Examiner explains that the organic layer of Ong is densified

because "the organic molecules layer 12 is made of polythiophene, which is the same organic molecules layer as disclosed in the instant specification, and is made by multiple stacks of conjugated bonds (col. 11, lines 10-11)" (Ans. 3, last para.). The Examiner further states that "the same kind of polythiophene molecule should have the same molecular orientation, which is substantially normal to the surface of the substrate, as claimed in the invention" (Ans. 6, last sentence).

It is well settled that when a claimed product reasonably appears to be substantially the same as a product disclosed by the prior art, the burden is on the applicant to prove that the prior art product does not necessarily or inherently possess characteristics attributed to the claimed product. *See In re Best*, 562 F.2d 1252, 1255 (CCPA 1977). However, the initial burden is on the Examiner to set forth a factual basis for the position that the claimed and prior art products reasonably appear to be the same. Only then is the applicant required to rebut the presumption with objective evidence or compelling scientific reasoning.

In the present case, the Examiner has not made the case that the transistor of Ong necessarily comprises a densified layer. Appellant's Specification relates that one way of forming a densified layer is to deposit the molecules on a stretched substrate and then allow the substrate to relax. The Examiner, on the other hand, has not pointed to any disclosure in Ong that would indicate that the organic layer of the transistor is in a state that can be fairly characterized as densified. The Examiner's reference to Ong's teaching of the organic layer comprising intermolecular stacks is not sufficient. The Examiner cites no disclosure in Ong which indicates that the

organic layer is formed by a process that is similar to the process disclosed by Appellant, or any other process that would densify the layer.

The § 103 rejections suffer the same deficiency discussed above.

In conclusion, based on the foregoing, we are constrained to reverse the Examiner's rejections.

REVERSED

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